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AUTHOR Klein, Nancy K.
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ABSTRACT

The study compared performance of very low birthweight (VLBW) children at 5 years of age who were enrolled in regular preschool and kindergarten classes with matched classmate controls on cognitive measures and teacher rated classroom behavior. Outcome measures included the Slosson Intelligence Test, Developmental Test of Visual Motor Integration, and the Woodcock Johnson Psychoeducational Battery Preschool Scale. The 51-item Classroom Behavior Questionnaire was also used, with subscales of speech and language, classroom task behavior, personal social behavior, and school performance. Results indicated no significant differences between groups on the Slosson; however, there were significant differences on the Developmental Test of Visual Motor Integration and the spatial relations and quantitative concepts subscales of the Woodcock Johnson. Cluster analysis on the Classroom Behavior Questionnaire specified behavior problems areas and teachers showed a significant difference in rating VLBW Ss and controls on task orientation, school performance, verbal expression, and passivity. Findings suggest the utility of the combination of teacher ratings and standardized measures to identify preterm children most at risk for learning problems. (CL)

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Behavior of Very Low Birthweight Children at School

Nancy K. Klein
Cleveland State University
College of Education
Cleveland, Ohio 44115

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Introduction

Recent studies of very low birth weight children, those weighing less than 1500 grams at birth, document an improved survival rate and a decrease in the incidence of severe neurodevelopmental handicap. Studies of this population at school age, by our group and others, have shown that this population may be at risk for the more subtle problems that only become evident when the child attends school. Several studies have indicated that there is a higher incidence of perceptual, visual motor, language and school related behavior problems among very low birthweight children.

With the advent of Public Law 94-142, The Education of All Handicapped Children's Act, and the push for early identification as prevention of learning disabilities, one question which emerges is the degree to which early identification procedures can be devised which accurately identify VLBW children most likely to experience school difficulty. Prenatal, birth and perinatal factors have not been effective in predicting school problems. Given not all VLBW children are at risk of learning problems, what early identification strategies are potentially effective in identifying VLBW children most in need of intervention?

Several studies have indicated that teachers are highly accurate predictors of who will and who will not need intervention. Experienced teachers appear to be sensitive to the presence or absence of classroom behavior which results in productive learning. Teachers have a unique perspective on the child's daily ability to cope with classroom demands and

routines. Teacher ratings of classroom behavior in combination with data from standardized tests have been found by several writers to be an effective combination for early identification of problems.

The purpose of this study was to compare the performance of very low birthweight children at 5 years of age who were enrolled in regular preschool and kindergarten classrooms with matched classmate controls on several cognitive measures and teacher rated classroom behavior. Our second objective was to identify specific classroom behaviors associated with depressed standardized test performance as a strategy for identifying very low birthweight children most at risk of learning problems during school.

Subjects and methods

All children included in this study were born in 1976 and treated in the neonatal intensive care unit at Rainbow Babies and Children's Hospital. There were 112 survivors, of whom 80 were seen at the 5-year follow-up visit. At the time of testing, 68 (85%) children were enrolled in regular preschool/ Kindergarten programs, five of whom were receiving supplementary special services, five (6%) children were in special classes for handicapped children, and seven (9%) children were not yet in school.

Regarding the neurodevelopmental status of these 68 children, 88% had IQ's above 85 and no neurological abnormality. Three children (4%) with cerebral palsy also had IQ's within the normal range, and five children (8%) in the regular class had IQ's below 84.

An attempt was made to match each of the very low birthweight children with classmate controls by race, sex, and social class. No appropriate matches were found for six children, leaving 62 pairs who are the subjects of

this study. The mean birthweight for the VLBW children was 1.2 Kilos, compared to 3.3 Kilos for controls. Preterm children were born at a mean gestational age of 30 weeks.

Sixty-one percent of the subjects were male and 51% were black. The maternal levels of education are presented in Table 1. There were no significant differences in maternal age or mother's level of education. The majority of children in both groups had mothers with high school or less. There were also no significant differences in the number of children in the family or birth order.

Social class membership for each group is presented in Table 2. There were no significant differences between the groups in social class membership or marital status. The majority of children in both groups were in the lower social classes.

The outcome measures employed in this study included the Slosson Intelligence Test, Developmental Test of Visual Motor Integration, and the six subtests of the Woodcock Johnson Psychoeducational Battery Preschool Scale. In addition, teachers completed the 51 item Classroom Behavior Questionnaire which is divided into four subscales: Speech and language, classroom task behavior, personal social behavior, and school performance.

Results and discussion

Outcome results are presented in Table 3. These results indicated that there were no significant differences between groups on the Slosson. There were significant differences on the Developmental Test of Visual Motor Integration and the Spatial Relations and Quantitive Concepts subscale of the Woodcock Johnson Psychoeducational Battery.

The spatial relations subtests requires children to visually identify parts which comprise the whole. As the items progress, the patterns become more complex.

The quantitative concepts subscale uses visual stimuli to tap children's basic knowledge of quantitative relationships.

Cluster analyses were performed on the 51 items of the Classroom Behavior Questionnaire in order to specify more clearly the nature of classroom behavior problems. Behavior clusters were formed for TASK ORIENTATION, which includes attending to tasks, following directions, distractibility; SCHOOL PERFORMANCE, which includes auditory, visual, letter discrimination skills and overall school performance; VERBAL EXPRESSION, the ability to express thoughts and ideas; ACTIVE IN CLASS, which is the child's activity level, and PASSIVE, which includes shy, withdrawn, behavior and isolated play. Several of these behavior clusters were reported by Simmer as effective warning signs for use with kindergarten age children most at risk of learning problems in the elementary years.

Table 4 presents the behavior of VLBW and control children as assessed by their teachers. Significant differences were found on TASK ORIENTATION, SCHOOL PERFORMANCE, VERBAL EXPRESSION, and PASSIVITY. The very low birthweight children were not more active then classmate controls.

In order to assess the relationship of behavior clusters to the cognitive measures, pearson product moment correlations were computed. Strong and significant relationships were found between the TASK ORIENTATION cluster and 6 of the 9 outcome measures for preterm children as presented in Table 5.

On the SCHOOL CLUSTER, which includes auditory, visual, and letter discrimination skills, significant correlations were found between the Slosson and Binet, and the visual, visual motor measures on which very low birthweight children performed more poorly. (See Table 6.)

On the VERBAL CLUSTER, that is the teacher's assessment of the child's ability to express thoughts and ideas, there were significant correlations between the Slosson, Binet and the Memory for Sentences and Quantitative Concepts subtests of the Woodcock Johnson. (See Table 7.)

Passive behavior was assessed in terms of the child's quiet, withdrawn behavior. The correlations between passive behavior indicate significant correlations between passive behavior on the Slosson and Binet. Active behavior is much less strongly related to outcome measures. (See Table 8.)

The finding that preterm children have difficulty attending to tasks and following directions as well as difficulty with visual, auditory, and letter discrimination skills, and that these behaviors are strongly related to several outcome measures, suggests that these are teacher rated behaviors which merit attention at this early age. The teacher who interacts with the child on a daily basis is in the best position to assess the child's ability to attend to and complete ttasks and follow directions. Simmer (1983) reviewed several studies which found strong correlations between these teacher rated behaviors and achievement scores in first, second and fifth grade. Similarly, teacher rated verbal fluency is strongly correlated with 3rd grade achievement.

Given Simmer's review, our data indicate that the combination of teacher ratings and standardized measures as the strategy for identifying preterm children most at risk of learning problems holds promise for enhancing the accuracy of identification. Accurate identification at this early stage in the child's school experience is the first step to providing educational services designed to ameliorate such learning problems.

Reference

Simmer, M. (1983). The warning signs of school failure: An updated profile of the at-risk kindergarten child. Topics in Early Childhood Special Education, 3/3, 1983, 17-28.

Table 1. Levels of maternal education and related demographic variables for VLBW and control children.

	VLBW (n=62)	CONTROL (n=62)
MATERNAL EDUCATION (N;%)		
More than high school	20 (32%)	21 (33%)
High School Graduates	32 (51%)	30 (48%)
Less than high school	10 (17%)	11 (18%)
MATERNAL AGE (x;S.D.)	25 (8)	24 (6)
CHILDREN IN FAMILY (x;S.D.)	2.2 (1)	2.3 (1)
BIRTH ORDER (x;S.D.)	1.6 (.6)	1.4 (.6)

Table 2. Social class status and demographic variables of VLBW and control children.

	VLBW (n=62)	CONTROL (n=62)
MARRIED (N;percent)	40 (65%)	44 (70%)
BLACK (N;percent)	38 (61%)	38 (61%)
MALE (N;percent)	32 (51%)	32 (51%)
SOCIAL CLASS		
1-3	17 (27%)	18 (29%)
4	30 (49%)	26 (42%)
5	15 (24%)	18 (29%)

Table 3. Cogitive outcome results of VLBW and control children in regular classrooms.

COGNITIVE ASSESSMENT OUTCOME RESULTS

	VLBW (n=62) Mean (S.D.)	CONTROL (n=62) Mean(S.D.)	P
SLOSSON INTELLIGENCE TEST	108 (13)	110 (12)	N.S.
DEVELOPMENTAL TEST OF VISUAL MOTOR INTEGRATION	8 (2)	10 (2)	< .0001
WOODCOCK JOHNSON			
PSYCHOEDUCATIONAL BATTERY			
PRESCHOOL SCALE SUBTESTS			
BLENDING	8 (3)	8 (3)	N.S.
PICTURE VOCABULARY	9 (3)	9 (3)	N.S.
VISUAL/AUDITORY LEARNING *	65 (23)	61 (22)	N.S.
MEMORY FOR SENTENCES	8 (2)	9 (2)	N.S.
SPATIAL RELATIONS	24 (6)	28 (4)	< .0001
QUANTITATIVE CONCEPTS	6 (2)	8 (2)	< .0370

* Scored in terms of errors

Table 4. Behavior clusters for VLBW and control children.

	VLBW (n=62) Mean (S.D.)	CONTROL (n=62) Mean (S.D.)	P
TASK ORIENTATION	16 (9)	24 (6)	< .0001
SCHOOL PERFORMANCE	10 (6)	15 (4)	< .0001
VERBAL EXPRESSION	12 (6)	17 (3)	< .0001
ACTIVE IN CLASS	50 (11)	53 (10)	< .1625
PASSIVE IN CLASS	11 (4)	13 (2)	< .0001

Table 5. Correlations between outcome measures and TASK ORIENTATION cluster for VLBW children.

OUTCOME MEASURE	r	p
SLOSSON	.43	< .0005
BINET	.51	< .0001
DTVMI	.40	< .001
QUANTITATIVE CONCEPTS *	.51	< .0001
BLENDING *	.44	< .0004
SPATIAL RELATIONS *	.38	< .002

* Subtest from Woodcock Johnson Psychoeducational Battery Preschool Scale

Table 6. Correlations between cognitive outcome measures and SCHOOL cluster for VLBW children.

OUTCOME MEASURE	r	p
SLOSSON	.47	< .0001
DTVMI	.46	< .0002
BINET	.52	< .0001
QUANTITATIVE CONCEPTS *	.51	< .0001
SPATIAL RELATIONS *	.29	< .02

* Subtest of the Woodcock Johnson Psychoeducational Battery Preschool Scale

Table 7. Correlations between cognitive outcome measures and teacher rated VERBAL behavior for VLBW children.

	VERBAL CLUSTER	
OUTCOME MEASURE	r	p
SLOSSON	.44	< .0004
BINET	.48	< .0001
MEMORY FOR SENTENCES	.44	< .0005
QUANTITATIVE CONCEPTS	.35	< .005

Table 8. Correlations between cognitive outcome measures and teacher rated PASSIVE and ACTIVE behavior for VLBW children.

OUTCOME MEASURE	r	p
PASSIVE		
SLOSSON	.33	< .008
BINET	.39	< .002
ACTIVE		
BLENDING	.31	< .01
QUANTITATIVE CONCEPTS	.27	< .03